

## MEMORANDUM

**To:** Ron Paananen, HDR  
**Contract & Task Order:** DA Deliverable 4.1.29  
**From:** Meg Strong, LG, LHG  
**File Code:**  
Shannon & Wilson  
**Date:** May 19, 2025  
**Copies To:** Robyn Boyd  
Dave Becher  
Margaret Kucharski

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**Subject: Groundwater Monitoring Memorandum – Quarter No. 10, Voluntary Cleanup Program NW3242, Montlake Gas Station, Seattle, Washington**

### Background

In 2019, the Washington State Department of Transportation (WSDOT) entered the Former Montlake Gas Station property located in Seattle, Washington (site), into the Washington State Department of Ecology (Ecology) Voluntary Cleanup Program (VCP).

As part of the VCP application, Shannon & Wilson submitted a Remedial Investigation (RI) work plan and a subsequent RI report to Ecology, on behalf of WSDOT. The RI report included investigation data that was used to characterize the nature and extent of petroleum hydrocarbon contamination in soil and groundwater associated with historic fueling operations at the site (Shannon & Wilson, 2020).

In 2021, PBS Engineering and Environmental prepared and submitted to Ecology a Remedial Action Plan detailing the proposed remediation excavation activities for the site (PBS, 2021a). In August and September 2021, PBS oversaw the closure and removal of the site's underground storage tanks and piping, as well as the excavation of the associated petroleum-contaminated soil source zone (source zone), as documented in the Remedial Action Completion Report (PBS, 2021b). Soil compliance has been achieved at the site, as documented by confirmation sampling performed by PBS during the remedial excavation.

Groundwater compliance is currently being evaluated. Consecutive quarterly sampling at six monitoring wells (MW-2-19, MW-3-19, MW-6-22, MW-7-22, MW-8-22, and MW-9-22) was undertaken after remediation work through to July 2023 and at five wells through to March 2024. Five of the monitoring wells on the property were decommissioned after a property-specific

No Further Action letter was issued by Ecology in May 2024. The monitoring well locations are depicted in Exhibit 1.

The compliance groundwater monitoring (CGM) well network now consists of MW-3-19, which is the one remaining site monitoring well in which past sampling results have not met the groundwater compliance requirements. This memorandum presents the results of Quarter No. 10 CGM and documents the continued effect of the source zone removal on site groundwater quality. Results of the CGM for Quarter Nos. 1 through 9 have been presented previously under a separate cover (Shannon & Wilson, 2022a, 2022b, 2022c, 2023a, 2023b, 2023c, 2023d, 2024a, 2024b, and 2025). The Quarter No. 10 event was limited to sampling only MW-3-19.

## **Quarter No. 10 Groundwater Monitoring Activities**

### ***Access to MW-3-19***

Associated with construction work on the SR 520 project, the ground surface elevation in the vicinity of MW-3-19 was raised and the road alignment altered such that the well is now within the SR 520 access ramps. A concrete vault was constructed to provide access to the monitoring well that is secured with a locked lid. Access to monitoring well MW-3-19 therefore must be coordinated with ramp closures.

On March 20, 2025, Shannon & Wilson staff accessed MW-3-19 to remove oxygen-releasing compound (ORC®) socks from the monitoring well.

### ***Well Gauging and Groundwater Sampling***

On April 7, 2025, Shannon & Wilson gauged MW-3-19 to monitor for the presence of free product and to measure groundwater elevation at the well. Measurable free product was not encountered within MW-3-19 during Quarter No. 10 gauging; however, a petroleum odor was noted.

Shannon & Wilson purged MW-3-19 using a peristaltic pump with a flow-through cell and a water quality meter to measure the following field parameters: temperature, oxidation-reduction potential, pH, conductivity, dissolved oxygen, and turbidity. Field parameters collected during purging of the CGM wells can be found in Attachment 1 – Groundwater Sampling Field Form. After the parameters had stabilized, groundwater samples were collected from MW-3-19 by discharging groundwater from the end of the peristaltic tubing into clean, laboratory-supplied containers. Collected groundwater samples were immediately put on ice and stored within an insulated cooler. Groundwater samples from MW-3-19 were delivered to OnSite Environmental Inc. of Redmond, Washington (OnSite), under standard chain-of-custody procedures and analyzed for the following:

- Gasoline-range petroleum hydrocarbons using Ecology's Northwest Total Petroleum Hydrocarbon (NWTPH)-Gasoline Extended Method
- Benzene, toluene, ethylbenzene, and xylene (BTEX) by U.S. Environmental Protection Agency (EPA) Method 8260

- Diesel- and oil-range petroleum hydrocarbons using Ecology's NWTPH-Diesel Extended Method (NWTPH-Dx)
- Total and dissolved arsenic by EPA Method 200.8

For complete details on the groundwater sampling methodology, refer to the Sample Collection and Chemical Testing sections of the Work Plan (Shannon & Wilson, 2019).

A sample was also collected from the purge water drum for use in characterizing the water for disposal.

### ***ORC Sock Deployment***

Following completion of the Quarter No. 10 well gauging and groundwater sampling activities, Shannon & Wilson installed three new RegenesiS ORC<sup>®</sup> socks below the water table and within the screened portion of MW-3-19, due to continued contaminant detections at the well. The ORC<sup>®</sup> socks are a remedial technology designed by RegenesiS to expedite and aid in the natural aerobic degradation process of petroleum hydrocarbon contaminants. The timeline for use is approximately one year, and the current ORC<sup>®</sup> socks deployed in MW-3-19 will be replaced with new ORC<sup>®</sup> socks upon WSDOT approval.

## **Quarter No. 10 Results and Interpretation**

### ***Groundwater Elevation***

The measured groundwater elevation for Quarter No. 10 is reported in Exhibit 2. Groundwater elevations are in North American Vertical Datum (of 1988). At MW-3-19, during April 2025, the groundwater elevation was approximately at the same depth as in November 2024.

### ***Groundwater Sampling Results***

The laboratory analytical results for collected groundwater samples are summarized in Exhibit 3. The laboratory report is included as Attachment 2.

### ***Groundwater Sampling Interpretation***

Groundwater samples from MW-3-19 contained contaminant concentrations that exceeded applicable cleanup levels (CULs) (Exhibit 3).

Concentrations of gasoline-, diesel-, and lube oil-range petroleum hydrocarbons detected in MW-3-19 during Quarter No. 10 were greater compared to Quarter No. 9. The diesel-range petroleum hydrocarbon concentration continues to be flagged as being influenced by the gasoline-range petroleum hydrocarbons (Exhibit 3). The concentration of (1) gasoline-range and (2) diesel-range plus oil-range petroleum hydrocarbons measured in the CGM wells over time have been summarized as trend plots and included as Exhibits 4 and 5, respectively.

Concentrations of benzene were also greater compared to Quarter No. 9 and similar to concentrations from samples collected in February 2024. Except for this event, generally, benzene concentrations have been trending downwards since May 2022 (Exhibit 6).

(Note: toluene, ethylbenzene, and xylene concentrations have not exceeded applicable CULs during any of the quarterly CGM events.)

Concentrations of total and dissolved arsenic rebounded to similar values from prior to the Quarter 9 event. However, as was concluded in the RI (Shannon & Wilson, 2020), the subsurface petroleum hydrocarbon contamination is suspected to be mobilizing arsenic to groundwater due to the reducing/anaerobic geochemical subsurface conditions produced as a result of the site petroleum hydrocarbon contamination. As petroleum hydrocarbon concentrations continue to diminish (Exhibits 4 and 5), dissolved and total arsenic concentrations at MW-3-19 should also continue to diminish as the groundwater recovers to more oxidizing/aerobic conditions (the naturally occurring arsenic mobilization reduces). The concentration of total and dissolved arsenic in CGM wells over time has been summarized in trend plots, included as Exhibit 7.

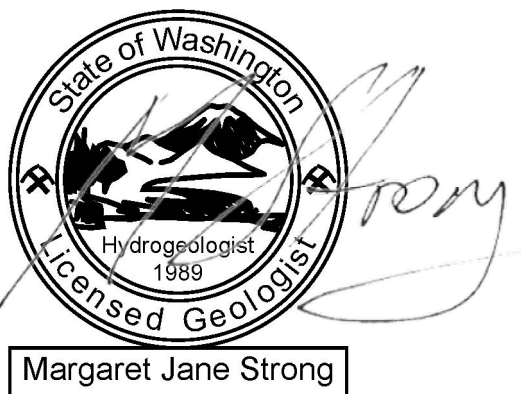
MW-3-19 is the most downgradient CGM well at the site, the furthest from the remedial excavation area, and is located outside the property boundary. The overall decline in contaminants observed at MW-3-19 may be reflective of the lagged timing that would be expected for remedial action to manifest in groundwater concentrations near this furthest downgradient well.

Given the ongoing exceedance of the compliance values in groundwater at well MW-3-19, it is recommended that monitoring be performed on an annual basis until compliance is met.

We appreciate this opportunity to provide environmental services to you for this project. If you have questions regarding this letter, please contact the undersigned at (206) 632-8020.

Sincerely,

Shannon & Wilson



Meg Strong, LG, LHG  
Senior Consultant

MJS:JNB/meh:jxs

## References

- PBS Engineering and Environmental, 2021a, Remedial action plan, Montlake Gas Station, State Route 520 Montlake to Lake Washington Interchange and Bridge Replacement Project, Seattle, Washington: Report prepared by PBS, Seattle, Wash., project no. 41221.003, for Graham Contracting Ltd, Bellevue, Wash., March Seattle, Wash., March 2021.
- PBS Engineering and Environmental, 2021b, Remedial action completion report, Montlake Gas Station, State Route 520 Montlake to Lake Washington Interchange and Bridge Replacement Project, Seattle, Washington: Report prepared by PBS, Seattle, Wash., 41221.003, for Graham Contracting Ltd., Bellevue, Wash., December.
- Shannon & Wilson, 2019, Data gaps investigation work plan/sampling and analysis plan for Montlake Gas Station, SR 520 Bridge Replacement and HOV Program, Seattle, Washington: Workplan prepared by Shannon & Wilson, Seattle, Wash., 21-1-22242-101, for Washington State Department of Transportation, July.
- Shannon & Wilson, 2020, Remedial investigation report for Montlake Gas Station, SR 520 Bridge Replacement and HOV Program, Seattle, Washington: Report prepared by Shannon & Wilson, Seattle, Wash., 21-1-22242-104, for Washington State Department of Transportation, 1 v., March.
- Shannon & Wilson, 2022a, Compliance groundwater monitoring well installation exhibit for Montlake Gas Station, SR 520 Bridge Replacement and HOV Program, Seattle, Washington: Exhibit prepared by Shannon & Wilson, Seattle, Wash., 21-1-22242-104, for Washington State Department of Transportation, May 2022.
- Shannon & Wilson, 2022b, Groundwater monitoring memorandum – quarter no. 1, voluntary cleanup program NW3242, Montlake Gas Station, SR 520 Bridge Replacement and HOV Program, Seattle, Washington: Memorandum from Joseph Sawdey and Meg Strong, Shannon & Wilson, Seattle, Wash., 21-1-22242-104, to Ron Paananen, HDR, June 27.
- Shannon & Wilson, 2022c, Groundwater monitoring memorandum – quarter no. 2, voluntary cleanup program NW3242, Montlake Gas Station, SR 520 Bridge Replacement and HOV Program, Seattle, Washington: Memorandum from Joseph Sawdey and Meg Strong, Shannon & Wilson, Seattle, Wash., 21-1-22242-104, to Ron Paananen, HDR, October 6.
- Shannon & Wilson, 2023a, Groundwater monitoring memorandum – quarter no. 3, voluntary cleanup program NW3242, Montlake Gas Station, SR 520 Bridge Replacement and HOV Program, Seattle, Washington: Memorandum from Joseph Sawdey and Meg Strong, Shannon & Wilson, Seattle, Wash., 21-1-22242-104, to Ron Paananen, HDR, January 5.

Shannon & Wilson, 2023b, Groundwater monitoring memorandum – quarter no. 4, voluntary cleanup program NW3242, Montlake Gas Station, SR 520 Bridge Replacement and HOV Program, Seattle, Washington: Memorandum from Joseph Sawdey and Meg Strong, Shannon & Wilson, Seattle, Wash., 21-1-22242-104, to Ron Paananen, HDR, March 30.

Shannon & Wilson, 2023c, Groundwater monitoring memorandum – quarter no. 5, voluntary cleanup program NW3442, Montlake Gas Station, SR 520 Bridge Replacement and HOV Program, Seattle, Washington: Memorandum from Joseph Sawdey and Meg Strong, Shannon & Wilson, Seattle, Wash., 21-1-22242-104, to Ron Paananen, HDR, June 23.

Shannon & Wilson, 2023d, Groundwater monitoring memorandum – quarter no. 6, voluntary cleanup program NW3442, Montlake Gas Station, SR 520 Bridge Replacement and HOV Program, Seattle, Washington: Memorandum from Joseph Sawdey and Meg Strong, Shannon & Wilson, Seattle, Wash., 21-1-22242-104, to Ron Paananen, HDR, October 30.

Shannon & Wilson, 2024a, Groundwater monitoring memorandum – quarter no. 7, voluntary cleanup program NW3442, Montlake Gas Station, SR 520 Bridge Replacement and HOV Program, Seattle, Washington: Memorandum from Joseph Sawdey and Meg Strong, Shannon & Wilson, Seattle, Wash., 21-1-22242-104, to Ron Paananen, HDR, January 22.

Shannon & Wilson, 2024b, Groundwater monitoring memorandum – quarter no. 8, voluntary cleanup program NW3442, Montlake Gas Station, SR 520 Bridge Replacement and HOV Program, Seattle, Washington: Memorandum from Joseph Sawdey and Meg Strong, Shannon & Wilson, Seattle, Wash., 21-1-22242-104, to Ron Paananen, HDR, May 8.

Shannon & Wilson, 2025, Groundwater monitoring memorandum – quarter no. 9, voluntary cleanup program NW3442, Montlake Gas Station, SR 520 Bridge Replacement and HOV Program, Seattle, Washington: Memorandum from Meg Strong, Shannon & Wilson, Seattle, Wash., 21-1-22242-104, to Ron Paananen, HDR, January 7.

## **Exhibits**

Exhibit 1 – Monitoring Well Locations

Exhibit 2 – Groundwater Level Measurements

Exhibit 3 – Summary of Groundwater Analytical Results

Exhibit 4 – Groundwater Concentration Trend Plots – Gasoline

Exhibit 5 – Groundwater Concentration Trend Plots – Diesel Plus Oil

Exhibit 6 – Groundwater Concentration Trend Plots – Benzene

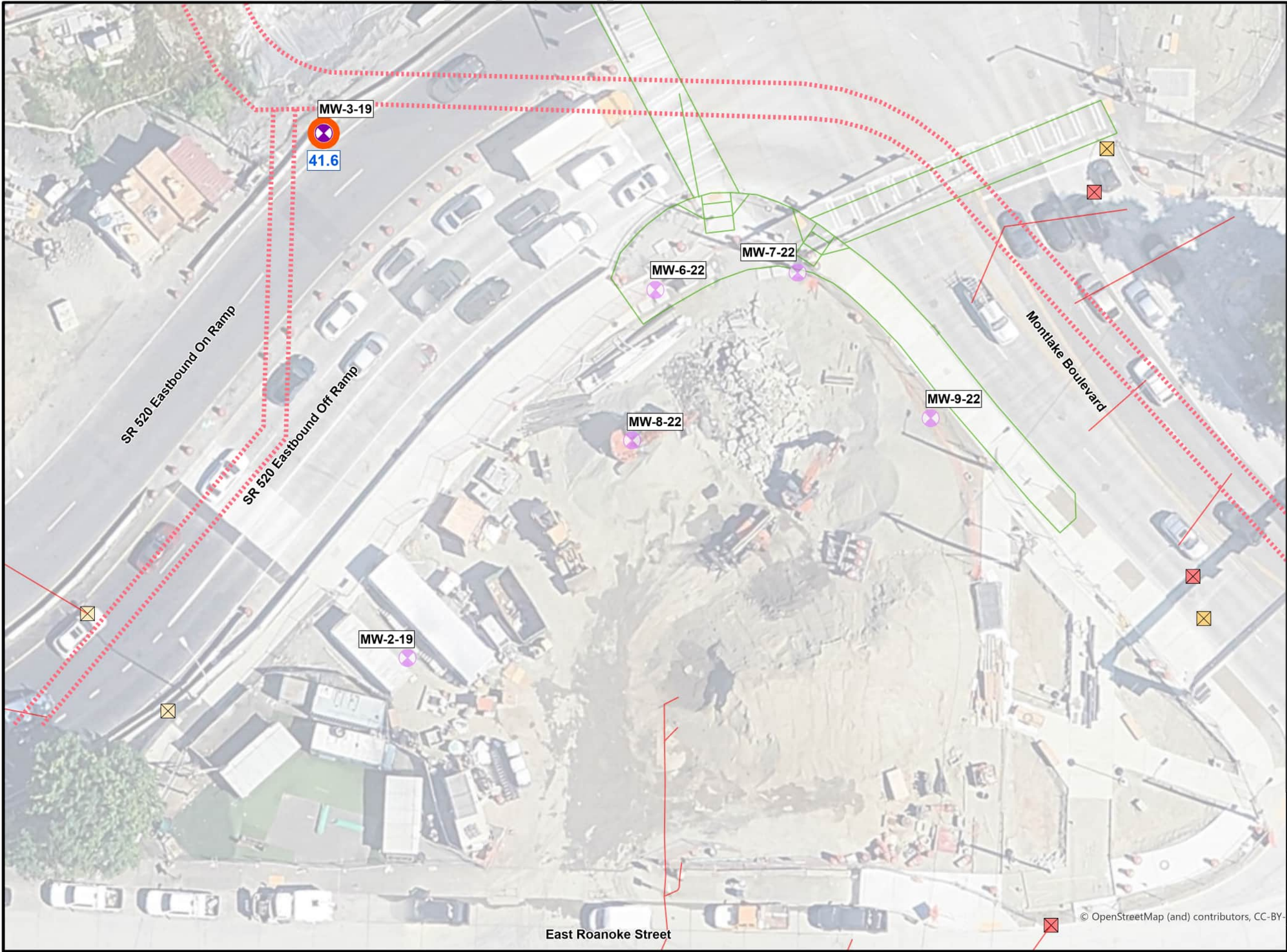
Exhibit 7 – Groundwater Concentration Trend Plots – Arsenic

## **Attachments**

Attachment 1 – Groundwater Sampling Field Forms

Attachment 2 – Laboratory Report and Chain-of-Custody Form





### LEGEND

Decommissioned Monitoring Well Location and Designation

Well With Groundwater Concentrations Exceeding Applicable Cleanup Levels

Groundwater Elevation at Monitoring Well (April 2025)

Existing Utility - Catch Basin

Existing Utility - Inlet

Existing Utility - Wastewater Pipe

Existing Utility - Sewer or Combined-Sewer Line

Approximate Post Construction Crosswalk/Sidewalk Configuration

NOTES:

1. All Existing Utility data should be considered approximate. City of Seattle, 2019.

0 40

Feet

SR 520 Bridge Replacement and HOV Program  
SR 520 I-5 to Montlake -I/C and Bridge Replacement  
Groundwater Monitoring Report No. 7  
2625 East Montlake Place East  
Seattle, WA

### MONITORING WELL LOCATIONS

April 2025

21-1-22242-104

SHANNON & WILSON, INC.  
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

EXHIBIT 1



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**EXHIBIT 2**  
**GROUNDWATER LEVEL MEASUREMENTS**

**SR 520 Bridge Replacement and HOV Program**  
**SR 520 I-5 to Montlake - I/C and Bridge Replacement**  
**Groundwater Monitoring Memorandum - Quarter No. 10**

Montlake Gas Station Monitoring Well	Screened Interval (feet bgs)	Surveyed Monitoring Well Elevation <sup>1</sup> (feet)	TOC Elevation (feet)	Date	Depth to Water (feet below TOC)	Groundwater Elevation (feet)
MW-2-19	10 to 20	58.87	58.12	10/17/2019	10.1	48.0
				5/2/2022	8.3	49.8
				8/16/2022	9.4	48.7
				11/15/2022	9.9	48.2
				2/14/2023	8.4	49.8
				5/17/2023	8.6	49.6
				8/9/2023	9.8	48.3
				11/17/2023	8.2	49.9
				2/19/2024 <sup>4</sup>	-	-
				11/13/2024 <sup>4</sup>	-	-
				04/07/2025 <sup>4</sup>	-	-
MW-3-19	10 to 25	59.29	59.01	10/17/2019	17.4	41.6
				5/2/2022	17.3	41.8
				8/16/2022	17.4	41.6
				11/15/2022	17.5	41.5
				2/14/2023	17.5	41.6
				5/17/2023	17.4	41.6
				8/25/2023	17.5	41.6
				11/17/2023	17.2	41.8
				2/19/2024	16.7	42.3
				11/13/2024	17.5	41.5
				04/07/2025	17.4	41.6
MW-6-22	11 to 26	59.71	59.36	5/2/2022	12.2	47.2
				8/16/2022	13.9	45.5
				11/15/2022	14.9	44.4
				2/14/2023	12.5	46.8
				5/17/2023	13.0	46.4
				8/9/2023	14.7	44.7
				11/17/2023 <sup>2</sup>	-	-
				2/19/2024 <sup>4</sup>	-	-
				11/13/2024 <sup>4</sup>	-	-
				04/07/2025 <sup>4</sup>	-	-

**EXHIBIT 2**  
**GROUNDWATER LEVEL MEASUREMENTS**

**SR 520 Bridge Replacement and HOV Program**  
**SR 520 I-5 to Montlake - I/C and Bridge Replacement**  
**Groundwater Monitoring Memorandum - Quarter No. 10**

Montlake Gas Station Monitoring Well	Screened Interval (feet bgs)	Surveyed Monitoring Well Elevation <sup>1</sup> (feet)	TOC Elevation (feet)	Date	Depth to Water (feet below TOC)	Groundwater Elevation (feet)
MW-7-22	10.5 to 25.5	59.68	59.18	5/2/2022	12.1	47.1
				8/17/2022	13.8	45.4
				11/15/2022	14.8	44.4
				2/14/2023	12.4	46.8
				5/17/2023	12.8	46.3
				7/5/2023 <sup>3</sup>	13.9	45.2
MW-8-22	10.5 to 25.5	58.90	58.55	5/2/2022	11.3	47.2
				8/16/2022	13.0	45.6
				11/15/2022	14.0	44.5
				2/14/2023	11.6	46.9
				5/17/2023	12.1	46.5
				8/9/2023	13.8	44.8
				11/17/2023	9.6	49.0
				2/19/2024 <sup>4</sup>	-	-
				11/13/2024 <sup>4</sup>	-	-
MW-9-22	10 to 25	59.93	59.58	04/07/2025 <sup>4</sup>	-	-
				5/2/2022	12.4	47.2
				8/17/2022	14.1	45.5
				11/15/2022	15.1	44.5
				2/14/2023	12.7	46.9
				5/17/2023	13.1	46.4
				8/3/2023	14.9	44.7
				11/17/2023	10.7	48.9
				2/19/2024 <sup>4</sup>	-	-
				11/13/2024 <sup>4</sup>	-	-
				04/07/2025 <sup>4</sup>	-	-

**NOTES:**

- 1 Monitoring well elevation was surveyed from the center of the well monument lid.
  - 2 Monitoring well was inaccessible, no measurement was taken.
  - 3 MW-7-22 was gauged and sampled prior to it being decommissioned on 7/10/2022 by Graham.
  - 4 Monitoring well elevations were not surveyed in wells that were not sampled.
- The reference vertical datum is the North American Vertical Datum (of 1988).  
bgs = below ground surface; TOC = top of casing

EXHIBIT 3  
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

		Petroleum Hydrocarbons (µg/L)			Volatile Organic Compounds (µg/L) <sup>3</sup>					Metals (µg/L) <sup>4</sup>	
Montlake Gas Station Monitoring Well	Sample Date	Gasoline Range Organics <sup>1</sup>	Diesel Range Organics <sup>2</sup>	Lube Oil Range Organics <sup>2</sup>	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	Total Arsenic	Dissolved Arsenic
MW-2-19	10/17/2019	<100	<260	<420	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	5/2/2022	<100	<180	<240	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	8/16/2022	<100	<130	<210	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	11/15/2022	<100	<210	<210	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	2/14/2023	<100	<200	<200	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	5/17/2023	<100	<210	<210	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	8/9/2023	<100	<110	<220	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
MW-3-19 <sup>5</sup>	10/17/2019	1400	630	660	98	<4	24	9.3	1.1	17	7.4
	5/2/2022	5800	1300 M	500	170	<10	190	220	3.2	16	11
	2/14/2023	7300	2100 M	320	140	<5.0	72	94	2.3	22	13
	5/17/2023	8400	<1700 M	340	100	<20	79	120	<4.0	25	14
	8/25/2023	10000	2900 M	320	82	<20	37	90	<4.0	24	21
	11/18/2023	4900	1700 M	320	43	<10	11	22	<2.0	20	21
	2/19/2024	3700	1300 M	290	67	<20	8.5	10	<4.0	21	15
	11/13/2024	1700	1300 M	290	39	<5.0	1.7	4.7	<1.0	21	17
	11/13/2024 <sup>#</sup>	1800	1200 M	380	44	<5.0	1.4	4.7	<1.0	19	15
	4/7/2025	6300	1900 M	220	61	<20	<4.0	<8.0	<4.0	33	28
	4/7/2025 <sup>#</sup>	6200	1700 M	220	68	<20	4.7	10	<4.0	25	21
MW-6-22	5/2/2022	<100	210	330	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	8/16/2022	<100	<130	290	<0.20	<1.0	<0.20	<0.40	<0.20	6.3	4.5
	11/15/2022	<100	<200	<200	<0.20	<1.0	<0.20	<0.40	<0.20	7.3	4.6
	2/14/2023	<100	<210	<210	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	5/17/2023	<100	<210	<210	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	8/9/2023	<100	<100	<210	<0.20	<1.0	<0.20	<0.40	<0.20	4.6	<3.0
	8/25/2023	--	<160	<160	--	--	--	--	--	--	--
MW-7-22	5/2/2022	<100	<170	<230	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	8/17/2022	<100	<130	250	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	11/15/2022	<100	<210	<210	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	11/15/2022 <sup>#</sup>	<100	<210	220	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	2/14/2023	<100	<200	<200	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	5/17/2023	<100	<210	<210	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	7/6/2023	<100	<210	<210	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0

EXHIBIT 3  
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

		Petroleum Hydrocarbons (µg/L)			Volatile Organic Compounds (µg/L) <sup>3</sup>					Metals (µg/L) <sup>4</sup>	
Montlake Gas Station Monitoring Well	Sample Date	Gasoline Range Organics <sup>1</sup>	Diesel Range Organics <sup>2</sup>	Lube Oil Range Organics <sup>2</sup>	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	Total Arsenic	Dissolved Arsenic
MW-8-22	5/2/2022	<100	<170	<220	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	5/2/2022	<100	<170	<b>240</b>	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	8/16/2022	<100	<130	<b>360</b>	<0.20	<1.0	<0.20	<0.40	<0.20	<b>6.6</b>	<b>3.8</b>
	8/16/2022 <sup>#</sup>	<100	<140	<b>340</b>	<0.20	<1.0	<0.20	<0.40	<0.20	<b>6.5</b>	<b>4.3</b>
	11/15/2022	<100	<200	<200	<0.20	<1.0	<0.20	<0.40	<0.20	<b>6</b>	<b>5.7</b>
	2/14/2023	<100	<210	<210	<0.20	<1.0	<0.20	<0.40	<0.20	<b>4.2</b>	<3.0
	2/14/2023 <sup>#</sup>	<100	<200	<200	<0.20	<1.0	<0.20	<0.40	<0.20	<b>4.4</b>	<3.0
	5/17/2023	<100	<210	<210	<0.20	<1.0	<0.20	<0.40	<0.20	<b>4</b>	<3.0
	5/17/2023 <sup>#</sup>	<100	<220	<220	<0.20	<1.0	<0.20	<0.40	<0.20	<b>4.1</b>	<3.0
	8/9/2023	<100	<110	<b>260</b>	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	8/9/2023 <sup>#</sup>	<100	<110	<230	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	11/17/2023	<100	<110	<210	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	11/17/2023 <sup>#</sup>	<100	<110	<210	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
MW-9-22	5/2/2022	<100	<160	<220	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	8/17/2022	<100	<b>1900</b>	<300	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	11/15/2022	<100	<210	<210	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	2/14/2023	<100	<210	<210	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<b>3.0</b>
	5/17/2023	<100	<220	<220	<0.20	<1.0	<0.20	<0.40	<0.20	<b>3.9</b>	<3.0
	8/9/2023	<100	<110	<b>310</b>	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
	11/17/2023	<100	<100	<200	<0.20	<1.0	<0.20	<0.40	<0.20	<3.3	<3.0
Trip Blank	5/2/2022	<100	--	--	<0.20	<1.0	<0.20	<0.40	<0.20	--	--
	8/18/2022	<100	--	--	<0.20	<1.0	<0.20	<0.40	<0.20	--	--
	11/15/2022	<100	--	--	<0.20	<1.0	<0.20	<0.40	<0.20	--	--
	2/14/2023	<100	--	--	<0.20	<1.0	<0.20	<0.40	<0.20	--	--
	7/6/2021	<100	--	--	<0.20	<1.0	<0.20	<0.40	<0.20	--	--
	8/9/2023	<100	--	--	<0.20	<1.0	<0.20	<0.40	<0.20	--	--
	2/19/2024	<100	<0.16	<0.16	<0.20	<1.0	<0.20	<0.40	<0.20	--	--
MTCA Method A CUL		1000/800*	500	500	5.00	1000	700	1000†	1000†	20§	20§

NOTES:

1 Gasoline-range petroleum hydrocarbons using Washington State Department of Ecology's (Ecology's) NWTPH-Gasoline Extended Method

2 Diesel- and oil-range petroleum hydrocarbons using Ecology's NWTPH-Diesel Extended Method

3 Volatile organic compounds by EPA Method 8260D

4 Total and dissolved arsenic by EPA Method 200.8

5 In August and November 2022, MW-3-19 had measurable free product and was not sampled.

Highlighted text indicates the analyte was detected above the MTCA Method A CUL.

Highlighted text indicates the analyte was not detected, however the practical quantitation limit is above the MTCA Method A CUL.

**Bold** text indicates the analyte was detected above laboratory practical quantitation limit.

<sup>#</sup> Duplicate sample.

M flag indicates hydrocarbons in the gasoline range are impacting the diesel range result.

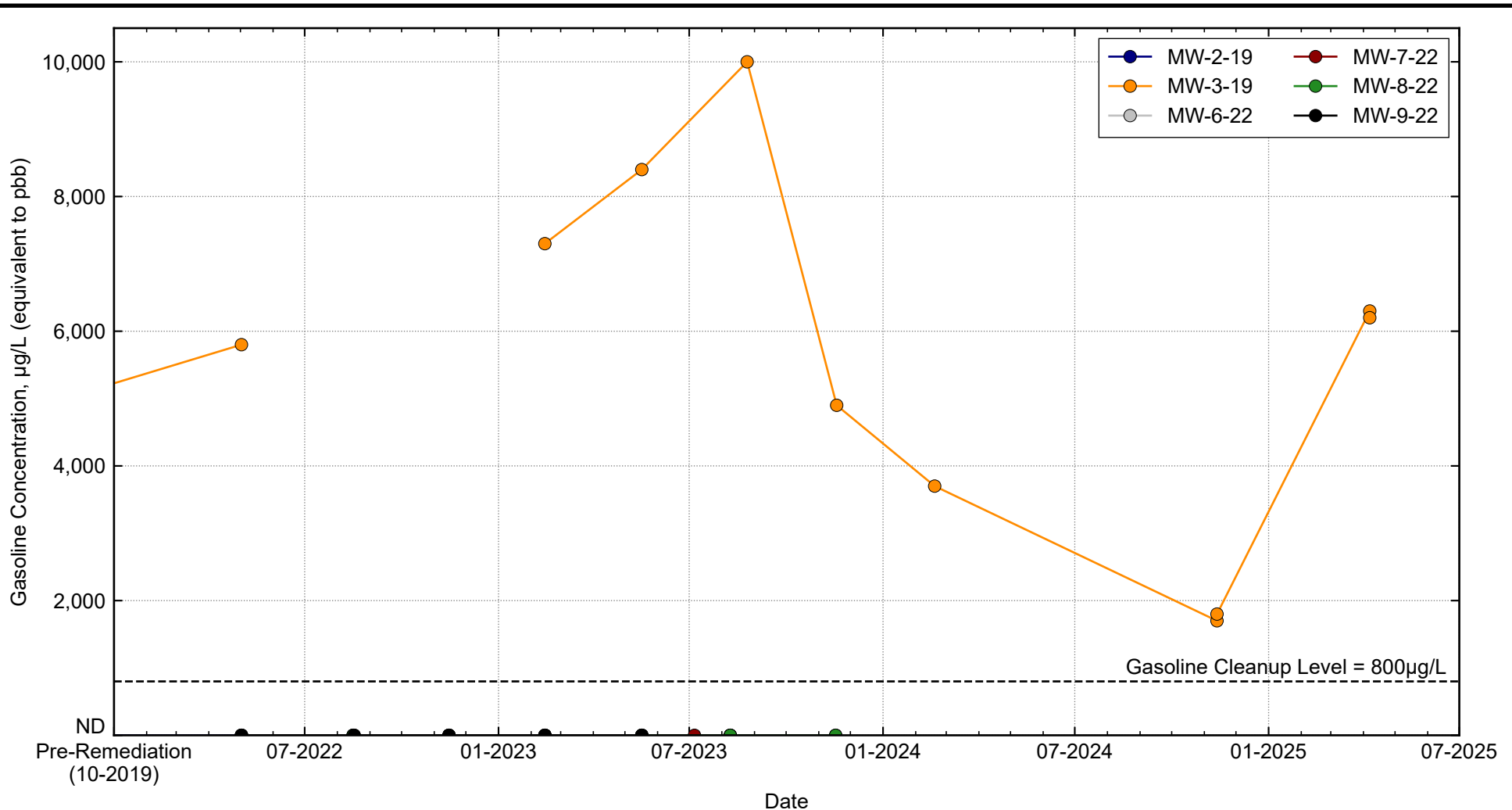
\* Cleanup level (CUL) for gasoline-range organics is 1,000 µg/L without the presence of benzene and 800 µg/L with the presence of benzene.

† MTCA Method A CUL for total xylenes is used because a MTCA Method A CUL is not established for the isomers of m-, p-, or o-xylene.

§ Site specific CUL for arsenic (total and dissolved) based on statistical analysis of natural background levels of arsenic in groundwater.

-- = not analyzed; < = not detected above laboratory reporting limit; CUL = cleanup level; EPA = U.S. Environmental Protection Agency; MTCA = Model Toxics Control Act; µg/L = micrograms per liter; NWTPH = Northwest Total Petroleum Hydrocarbons





**Notes:**

1. The time period between pre-remediation and quarterly monitoring has been condensed to compare data more closely.
2. MW-3-19 was not sampled during Q2 or Q3 due to the presence of non-aqueous phase liquid gauged in the well.
3. Gasoline concentrations non-detect (ND) in MW-2-19, MW-6-22, MW-7-22, MW-8-22, and MW-9-22 while these wells were included in quarterly sampling efforts.

SR 520 Bridge Replacement and HOV Program  
I-5 to Montlake - I/C and Bridge Replacement  
Groundwater Monitoring Report - Quarter No. 9

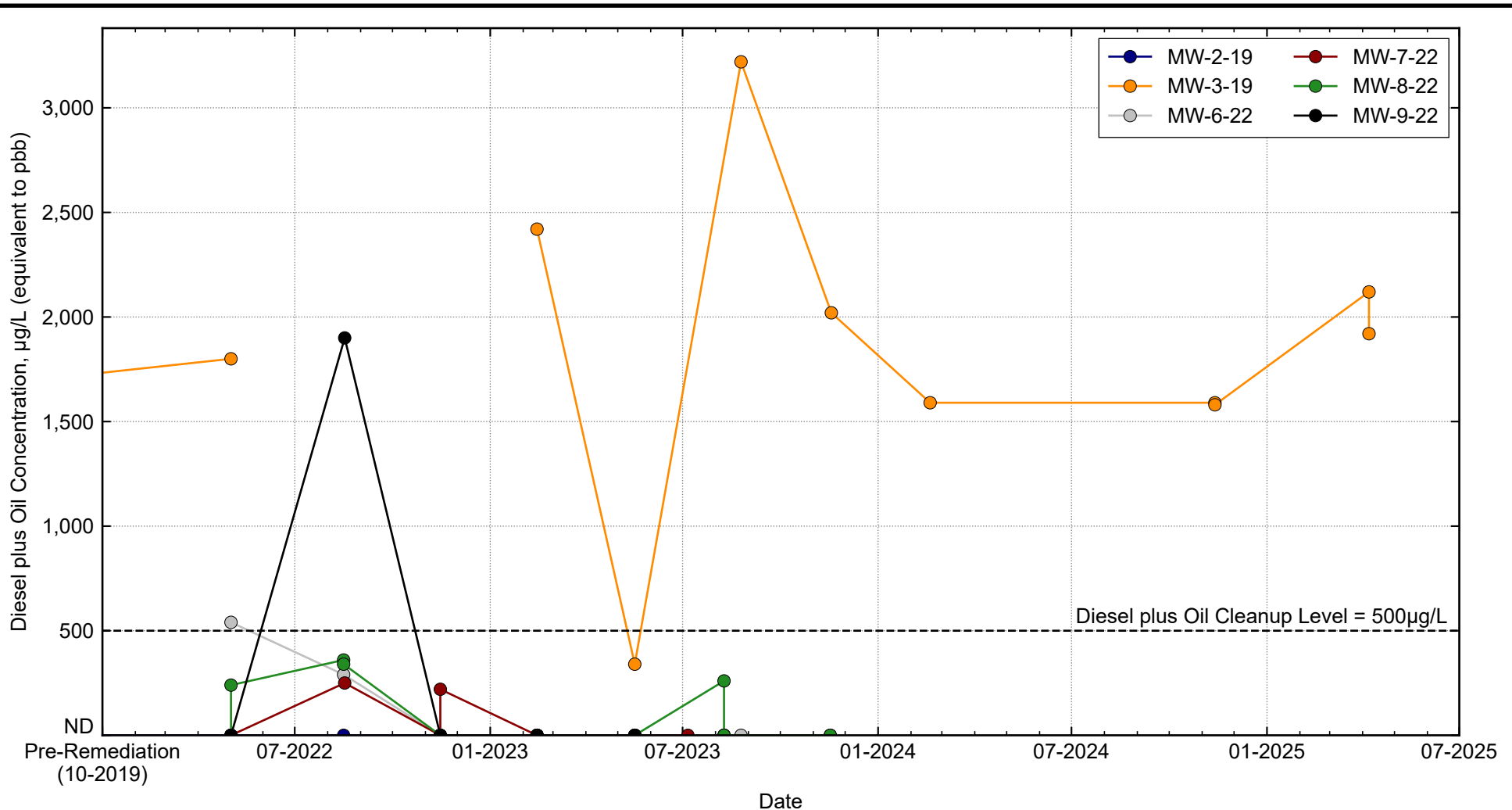
**GROUNDWATER CONCENTRATION  
TREND PLOT - GASOLINE**

May 2025

21-1-22242-104

**SHANNON & WILSON**

**EXHIBIT 4**



**Notes:**

1. The time period between pre-remediation and quarterly monitoring has been condensed to compare data more closely.
2. MW-3-19 was not sampled during Q2 or Q3 due to the presence of non-aqueous phase liquid gauged in the well.
3. Diesel/oil concentrations non-detect (ND) or below applicable cleanup levels in MW-2-19, MW-6-22, MW-7-22, MW-8-22, and MW-9-22 since November 2022 (Quarter No. 3) for a minimum of five subsequent quarterly monitoring events.

SR 520 Bridge Replacement and HOV Program  
I-5 to Montlake - I/C and Bridge Replacement  
Groundwater Monitoring Report - Quarter No. 9

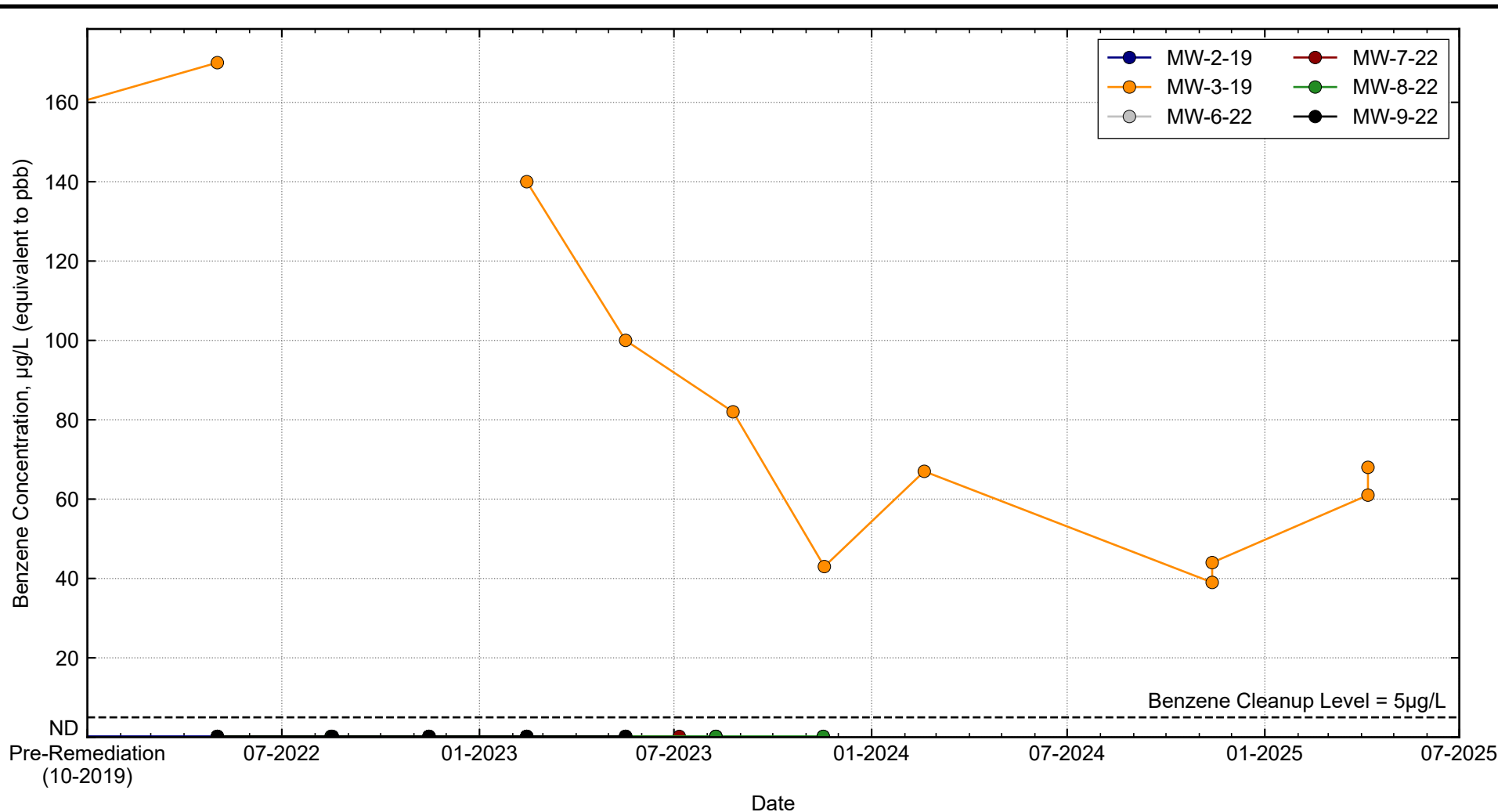
**GROUNDWATER CONCENTRATION  
TREND PLOT - DIESEL PLUS OIL**

May 2025

21-1-22242-104

**SHANNON & WILSON**

**EXHIBIT 5**



Notes:

1. The time period between pre-remediation and quarterly monitoring has been condensed to compare data more closely.
2. MW-3-19 was not sampled during Q2 or Q3 due to the presence of non-aqueous phase liquid gauged in the well.
3. Benzene concentrations non-detect in MW-2-19, MW-6-22, MW-7-22, MW-8-22, and MW-9-22 while these wells were included in quarterly sampling efforts.

SR 520 Bridge Replacement and HOV Program  
I-5 to Montlake - I/C and Bridge Replacement  
Groundwater Monitoring Report - Quarter No. 9

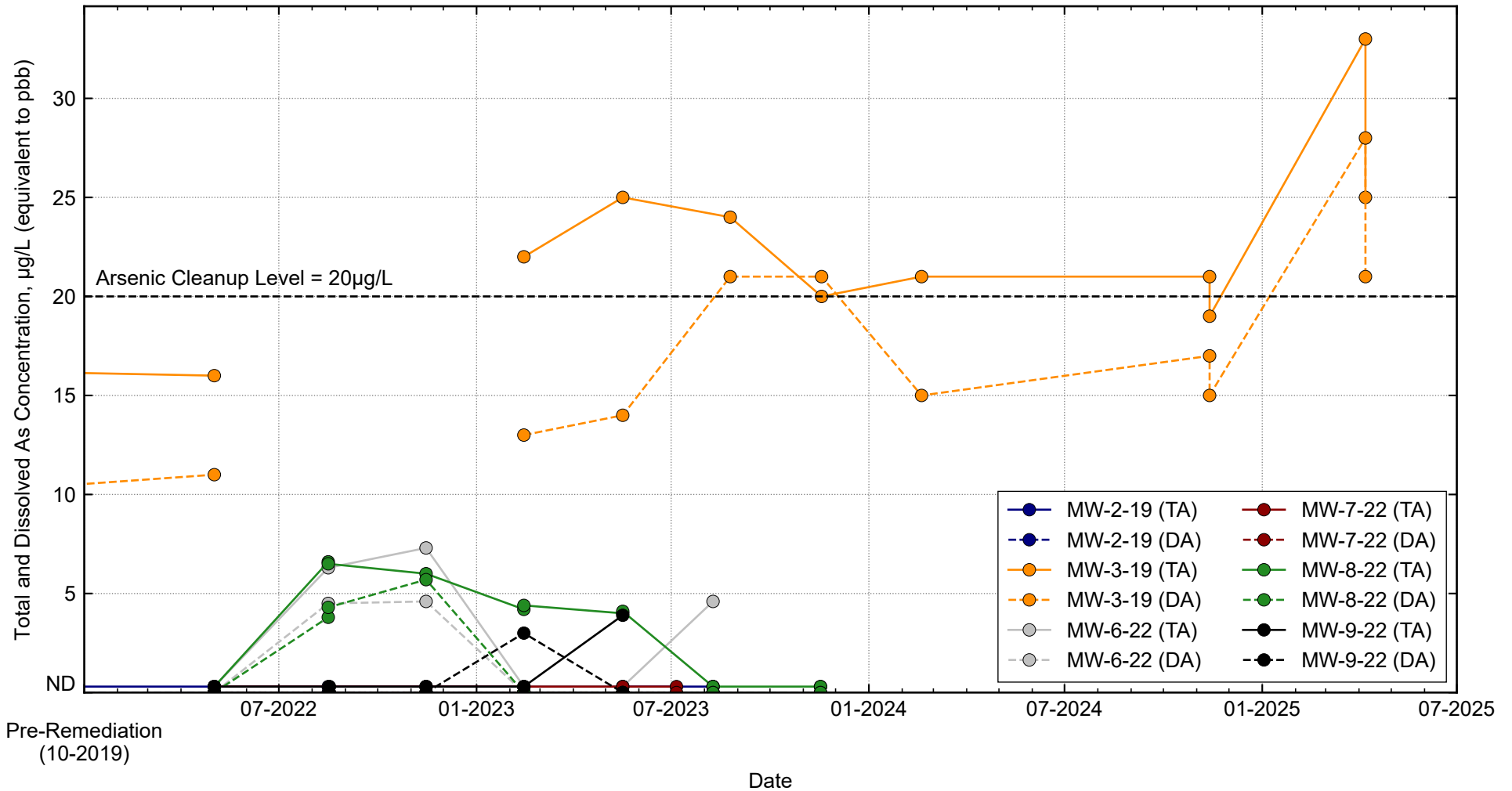
**GROUNDWATER CONCENTRATION  
TREND PLOT - BENZENE**

May 2025

21-1-22242-104

**SHANNON & WILSON**

**EXHIBIT 6**



SR 520 Bridge Replacement and HOV Program  
I-5 to Montlake - I/C and Bridge Replacement  
Groundwater Monitoring Report - Quarter No. 9

## GROUNDWATER CONCENTRATION TREND PLOT - ARSENIC

May 2025

21-1-22242-104

**SHANNON & WILSON**

**EXHIBIT 7**



## Attachment 1

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### Contents:

Groundwater Sampling Field Forms

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DATE: 04/07/25  
DUPLICATE NO: MW-100-0407 25  
MS / MSD?    Yes ☐    No ☐

LNAPL THICKNESS: \_\_\_\_\_ ft. Sample ☐

DNAPL THICKNESS: \_\_\_\_\_ ft. Sample ☐

Number	Size	Type	Pres.
<u>2</u>	<u>500mL</u>	<u>Amber</u>	<u>HCl</u>
<u><del>1</del> 1</u>	<u>500mL</u>	<u>Poly</u>	<u><del>1</del> HNO<sub>3</sub></u>
<u><del>1</del> 1</u>	<u>500mL</u>	<u>Poly</u>	<u>none</u>
<u>5</u>	<u>40mL</u>	<u>Vogel</u>	<u>HCl</u>

[illegible]

EVACUATION METHOD: Peristaltic pump

PUMP INTAKE DEPTH (if applicable): Mid screen

PURGE WATER DISPOSITION (e.g., drum #): Drum on site

WATER QUALITY (e.g., sheen, odor): noticeable odor

WATER QUALITY METER(S) USED: CALIBRATION DATE / TIME: YSI Pro plus, calibrated 04/07/25 @ 1900 (yr)

SAMPLING METHOD: EPA low flow

SAMPLING PERSONNEL: MEH

REMARKS (e.g., recovery rate): \* No OEP calibration fluid/waterhouse that wasn't expired.

SAMPLE TIME: 2145

DUPLICATE "TIME": 2200

TIME COMPLETED:

Gal / ft 1-1/4" = 0.077 2" = 0.16 3" = 0.37 4" = 0.65  
1-1/2" = 0.10 2-1/2" = 0.24 3-1/2" = 0.50 6" = 1.46

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## Attachment 2

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### Contents:

Laboratory Report and Chain-of-Custody Form (10 Sheets)

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14648 NE 95<sup>th</sup> Street, Redmond, WA 98052 • (425) 883-3881

April 14, 2025

Meg Strong  
Shannon & Wilson, Inc.  
400 N 34th Street, Suite 100  
Seattle, WA 98103

Re: Analytical Data for Project 21-1-22242-112  
Laboratory Reference No. 2504-126

Dear Meg:

Enclosed are the analytical results and associated quality control data for samples submitted on April 8, 2025.

**Please note that the remaining data will follow in the final report.**

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "DeB" followed by a stylized flourish.

David Baumeister  
Project Manager

Enclosures



---

OnSite Environmental, Inc. 14648 NE 95<sup>th</sup> Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: April 14, 2025  
Samples Submitted: April 8, 2025  
Laboratory Reference: 2504-126  
Project: 21-1-22242-112

### **Case Narrative**

Samples were collected on April 7, 2025 and received by the laboratory on April 8, 2025. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below. However the soil results for the QA/QC samples are reported on a wet-weight basis.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: April 14, 2025  
 Samples Submitted: April 8, 2025  
 Laboratory Reference: 2504-126  
 Project: 21-1-22242-112

**GASOLINE RANGE ORGANICS**  
**NWTPH-Gx**

Matrix: Water  
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID:</b>	<b>MW-3-19:040725</b>					
Laboratory ID:	04-126-01					
Gasoline	<b>6300</b>	100	NWTPH-Gx	4-9-25	4-9-25	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	101	61-122				
<b>Client ID:</b>	<b>MW-100:040725</b>					
Laboratory ID:	04-126-02					
Gasoline	<b>6200</b>	100	NWTPH-Gx	4-9-25	4-9-25	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	100	61-122				
<b>Client ID:</b>	<b>IDW-040725</b>					
Laboratory ID:	04-126-03					
Gasoline	<b>350</b>	100	NWTPH-Gx	4-9-25	4-9-25	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	87	61-122				



Date of Report: April 14, 2025  
 Samples Submitted: April 8, 2025  
 Laboratory Reference: 2504-126  
 Project: 21-1-22242-112

**GASOLINE RANGE ORGANICS  
 NWTPH-Gx  
 QUALITY CONTROL**

Matrix: Water  
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>METHOD BLANK</b>						
Laboratory ID:	MB0409W1					
Gasoline	<b>ND</b>	100	NWTPH-Gx	4-9-25	4-9-25	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	84	61-122				

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
<b>DUPLICATE</b>								
Laboratory ID:	04-080-04							
	ORIG	DUP						
Gasoline	<b>450</b>	<b>380</b>	NA	NA	NA	NA	17	30
Surrogate:								
Fluorobenzene				84	79	61-122		





Date of Report: April 14, 2025  
 Samples Submitted: April 8, 2025  
 Laboratory Reference: 2504-126  
 Project: 21-1-22242-112

### VOLATILE ORGANICS EPA 8260D

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: MW-3-19:040725</b>						
Laboratory ID: 04-126-01						
Benzene	61	4.0	EPA 8260D	4-9-25	4-9-25	
Toluene	ND	20	EPA 8260D	4-9-25	4-9-25	
Ethylbenzene	ND	4.0	EPA 8260D	4-9-25	4-9-25	
m,p-Xylene	ND	8.0	EPA 8260D	4-9-25	4-9-25	
o-Xylene	ND	4.0	EPA 8260D	4-9-25	4-9-25	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	94	68-133				
<i>Toluene-d8</i>	99	79-123				
<i>4-Bromofluorobenzene</i>	101	78-117				

<b>Client ID: MW-100:040725</b>						
Laboratory ID: 04-126-02						
Benzene	68	4.0	EPA 8260D	4-9-25	4-9-25	
Toluene	ND	20	EPA 8260D	4-9-25	4-9-25	
Ethylbenzene	4.7	4.0	EPA 8260D	4-9-25	4-9-25	
m,p-Xylene	10	8.0	EPA 8260D	4-9-25	4-9-25	
o-Xylene	ND	4.0	EPA 8260D	4-9-25	4-9-25	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	96	68-133				
<i>Toluene-d8</i>	99	79-123				
<i>4-Bromofluorobenzene</i>	99	78-117				

<b>Client ID: IDW-040725</b>						
Laboratory ID: 04-126-03						
Benzene	6.4	2.0	EPA 8260D	4-9-25	4-9-25	
Toluene	ND	10	EPA 8260D	4-9-25	4-9-25	
Ethylbenzene	ND	2.0	EPA 8260D	4-9-25	4-9-25	
m,p-Xylene	ND	4.0	EPA 8260D	4-9-25	4-9-25	
o-Xylene	ND	2.0	EPA 8260D	4-9-25	4-9-25	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	95	68-133				
<i>Toluene-d8</i>	99	79-123				
<i>4-Bromofluorobenzene</i>	99	78-117				



Date of Report: April 14, 2025  
 Samples Submitted: April 8, 2025  
 Laboratory Reference: 2504-126  
 Project: 21-1-22242-112

**VOLATILE ORGANICS EPA 8260D  
 QUALITY CONTROL**

Matrix: Water

Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>METHOD BLANK</b>						
Laboratory ID:	MB0409W1					
Benzene	ND	0.20	EPA 8260D	4-9-25	4-9-25	
Toluene	ND	1.0	EPA 8260D	4-9-25	4-9-25	
Ethylbenzene	ND	0.20	EPA 8260D	4-9-25	4-9-25	
m,p-Xylene	ND	0.40	EPA 8260D	4-9-25	4-9-25	
o-Xylene	ND	0.20	EPA 8260D	4-9-25	4-9-25	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	95	68-133				
<i>Toluene-d8</i>	100	79-123				
<i>4-Bromofluorobenzene</i>	100	78-117				

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0409W1									
	SB	SBD	SB	SBD	SB	SBD				
Benzene	10.2	9.66	10.0	10.0	102	97	76-124	5	15	
Toluene	10.5	10.0	10.0	10.0	105	100	75-120	5	15	
Ethylbenzene	10.9	10.5	10.0	10.0	109	105	80-121	4	15	
m,p-Xylene	21.7	20.9	20.0	20.0	109	105	80-122	4	15	
o-Xylene	10.9	10.4	10.0	10.0	109	104	80-121	5	15	
Surrogate:										
Dibromofluoromethane					92	92	68-133			
Toluene-d8					99	99	79-123			
4-Bromofluorobenzene					103	102	78-117			



Date of Report: April 14, 2025  
 Samples Submitted: April 8, 2025  
 Laboratory Reference: 2504-126  
 Project: 21-1-22242-112

**DIESEL AND HEAVY OIL RANGE ORGANICS  
 NWTPH-Dx**

Matrix: Water  
 Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID:</b>	<b>MW-3-19:040725</b>					
Laboratory ID:	04-126-01					
Diesel Range Organics	<b>1.9</b>	0.20	NWTPH-Dx	4-10-25	4-10-25	M
Lube Oil Range Organics	<b>0.22</b>	0.20	NWTPH-Dx	4-10-25	4-10-25	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	92	50-150				

<b>Client ID:</b>	<b>MW-100:040725</b>					
Laboratory ID:	04-126-02					
Diesel Range Organics	<b>1.7</b>	0.20	NWTPH-Dx	4-10-25	4-10-25	M
Lube Oil Range Organics	<b>0.22</b>	0.20	NWTPH-Dx	4-10-25	4-10-25	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	96	50-150				

<b>Client ID:</b>	<b>IDW-040725</b>					
Laboratory ID:	04-126-03					
Diesel Range Organics	<b>ND</b>	0.22	NWTPH-Dx	4-10-25	4-10-25	
Lube Oil Range Organics	<b>ND</b>	0.22	NWTPH-Dx	4-10-25	4-10-25	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	93	50-150				



Date of Report: April 14, 2025  
 Samples Submitted: April 8, 2025  
 Laboratory Reference: 2504-126  
 Project: 21-1-22242-112

**DIESEL AND HEAVY OIL RANGE ORGANICS  
 NWTPH-Dx  
 QUALITY CONTROL**

Matrix: Water  
 Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>METHOD BLANK</b>						
Laboratory ID:	MB0410W1					
Diesel Range Organics	<b>ND</b>	0.16	NWTPH-Dx	4-10-25	4-10-25	
Lube Oil Range Organics	<b>ND</b>	0.16	NWTPH-Dx	4-10-25	4-10-25	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	103	50-150				

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
<b>DUPLICATE</b>								
Laboratory ID:	SB0410W1							
	ORIG	DUP						
Diesel Fuel #2	<b>0.433</b>	<b>0.386</b>	NA	NA	NA	NA	11	40
<i>Surrogate:</i>								
<i>o-Terphenyl</i>				102	93	50-150		





### Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
- B - The analyte indicated was also found in the blank sample.
- C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
- E - The value reported exceeds the quantitation range and is an estimate.
- F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
- H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
- I - Compound recovery is outside of the control limits.
- J - The value reported was below the practical quantitation limit. The value is an estimate.
- K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
- L - The RPD is outside of the control limits.
- M - Hydrocarbons in the gasoline range are impacting the diesel range result.
- M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
- N - Hydrocarbons in the lube oil range are impacting the diesel range result.
- N1 - Hydrocarbons in diesel range are impacting lube oil range results.
- O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
- P - The RPD of the detected concentrations between the two columns is greater than 40.
- Q - Surrogate recovery is outside of the control limits.
- S - Surrogate recovery data is not available due to the necessary dilution of the sample.
- T - The sample chromatogram is not similar to a typical \_\_\_\_\_.
- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- U1 - The practical quantitation limit is elevated due to interferences present in the sample.
- V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
- W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
- X - Sample extract treated with a mercury cleanup procedure.
- X1 - Sample extract treated with a sulfuric acid/silica gel cleanup procedure.
- X2 - Sample extract treated with a silica gel cleanup procedure.
- Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
- Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.
- Z -
- ND - Not Detected at PQL
- PQL - Practical Quantitation Limit
- RPD - Relative Percent Difference



